


# **Using Electronic Data Linkages to Maximize EPHT Resources and Improve Response Time**



Presented by  
Cathy Gallagher, M.A.  
Risk Communicator  
Center for Environmental Health (CEH)  
Massachusetts Department of Public Health (MDPH)

# Center for Environmental Health

---

- Responds to environmental health concerns from different groups
- Provides communities with epidemiological and toxicological health assessments

# Center for Environmental Health

## *Who do we respond to?*

- Residents
- Local officials (health, selectman, etc.)
- Legislators
- Other local, state and federal environmental and health agencies
- Media

## *Why do they contact us?*

- Suspected disease clusters
  - Majority are related to cancer
- Suspected environmental exposures
  - General or site-related

# Community-Specific Environmental Health Investigations

- Health component
  - Massachusetts Cancer Registry (MCR)
  - Cancer incidence analyses
- Environmental component
  - Potential for exposures
  - Drinking water quality
  - Sampling data (e.g., soil, air)  
(if available)

# Historical Limitations in Response Time

- Despite triage protocol, requests for further evaluation still high
- Neighborhood level cancer incidence data not readily available
- Significant effort required to calculate census tract (CT) level rates
- Extended timeline for completion

# Standardized Incidence Ratio (SIR) Calculator

- Custom-programmed toolbar for ArcGIS
- Automates calculation of neighborhood [i.e., census-tract (CT)] level incidence rates for 23 different cancer types
  - Time period (1982 – 2000)
  - Gender
  - Age groups

# SIR Calculator (cont'd)

User is able to view:

- Color-shaded map with specific locations of individuals diagnosed with cancer
- Incidence data and statistics
  - Observed and expected number of diagnoses
  - SIR
  - 95% Confidence Interval
  - Number of ungeocoded records

## Layers

☐ CANCER\_POINTS

## Other

Pat\_Gender, TobaccoHistory

☒ M, non-smoker☒ M, current or former smoker☒ M, smoking status unknown☒ F, non-smoker☒ F, current or former smoker☒ F, smoking status unknown☒ Streets☒ Census Tract Map☒ 1990 CT Boundaries☒ Town Boundaries☒ SIR statistically significantly > expected☒ 1 <= n observed < 5☒ SIR Categories

USER\_CAN\_SIR.SIR

☒ more than 100% above expected☒ 51% to 100% above expected☒ 15% to 50% above expected☒ within 15% of expected☒ 15% to 50% below expected☒ more than 50% below expected

## Beha Sir ToolBar

MELROSE

Find Census Tracts Find Town SIR Settings Calculate SIR

BLANDFORD

BOLTON

BOSTON

BOURNE

BOXBOROUGH

BOXFORD

BOYLSTON

BRAintree

## Attributes of USER\_CAN\_SIR

	Observed	Expected	SIR	LowerCI	UpperCI
▶	31	30.065647	103	70.043350	146.358996
	28	28.761562	97	64.675004	140.707071
	34	29.826215	114	78.931190	159.300603
	32	41.521501	77	52.705319	108.801954

Record: 1 Show: All Selected Records (0 out of 2000 Selected)

## Attributes of Cancer

TobaccoHistory	Text_UsualOccupation
9	RETIRED
9	NO RESPONSE
0	NO RESPONSE
9	N/R

Record: 1 Show: All Selected Records (0 out of 2000 Selected)



# SIR Calculator Demonstration



# SIR Calculator

## DATA LAYERS/LINKAGES

- Massachusetts Cancer Registry
- U.S. Bureau of the Census
- GDT streets/political boundaries
- MassGIS

# Massachusetts Cancer Registry (MCR)

- Population-based surveillance system established in 1982
- Massachusetts law requires reporting of all newly diagnosed primary cancers in MA residents
  - ➔ Individual's primary residence at the time of their diagnosis of cancer is reported to the MCR
- Confidential database

# Information Available from the MCR

- Date of diagnosis
- Age at diagnosis
- Address at diagnosis
- Gender
- Race
- Date of birth
- Diagnosing facility
- Histology
- Tobacco History
- Occupation (limited)
- Parental occupation (limited)
- Previous cancer diagnoses (limited)

# Information Not Available from the MCR

---

- Lifestyle factors (other than tobacco use)
- Family history
- Medical history
- Residential history

# SIR Calculator

---

Special considerations:

- Security/confidentiality
- MCR database conversion
- Community-specific geocoding issues

# SIR Calculator

## “Streamlining the Process”

- Automated mapping for analysis of individual cancer diagnoses to determine spatial patterns or “clustering.”
- Simultaneous evaluation of cancer risk factors (e.g., age, cancer cell type, smoking status, and occupation).
- More staff time available for interpretation and communication of results to the public
- Will significantly improve response time for incoming requests for cancer cluster investigations
- Potential for future EPHT linkage opportunities

# SIR Calculator: Next Steps

- Update with more recent MCR data
- Possible future enhancements
  - Data refresh program
  - Improve reporting capabilities (i.e., summary tables)
  - Incorporate tool to improve active surveillance
- Currently exploring utility for other health outcomes (i.e., birth defects data)



# Environmental Data Linkage

- Work with federal, state, and local agencies to obtain available data
- Databases for linkage
  - Drinking water quality (e.g. public and private)
- Other databases being considered
  - Pesticide use
  - Outdoor air

# Massachusetts Department of Environmental Protection Data

## Water

- Public drinking water quality test results
- Surface water quality indicators

## Air

- Stationary Source Emission and Inventory System (SSEIS)

# Other Resources

---

- Local Agencies
  - Private well data
- Massachusetts Dept of Agricultural Resources
  - Pesticide Use
- National Air Toxics Database

# Environmental Data Linkage

## Challenges:

- Data exists in multiple formats
- Availability of historical sampling data
- Multiple wells → one distribution system
- Data collection may vary by community

# Environmental Data Linkage

## Next Steps:

- Develop protocol for merging data sources
- Link childhood cancer data with drinking water quality data
- Evaluate feasibility for linking other environmental data with cancer incidence data



**Thank You**

**Cathy Gallagher**  
**Massachusetts Dept. of Public Health**  
**(617) 624-5757**  
**[Cathy.Gallagher@dph.state.ma.us](mailto:Cathy.Gallagher@dph.state.ma.us)**